KEEPING PACE

A Monthly Newsletter devoted to the art of Darkroom Photography

Volume # 17 November 1988

Vacuum easels, are they really necessary?

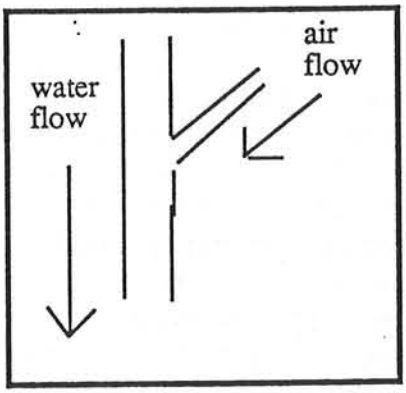
Vacuum easels. The different kinds that are available and what is good and bad about them.

How to build them yourself.

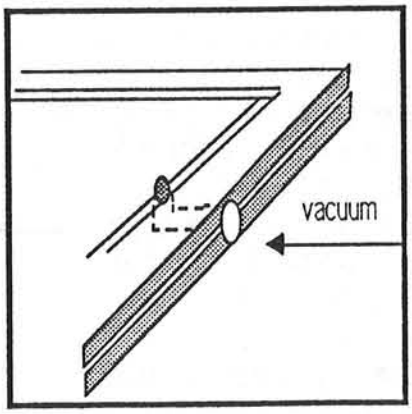
This is a subject that is close to my heart as I have built and used every conceivable kind of easel that you can imagine.

Remember, vacuum easels are not only used by Dye Transfer labs, but can be used by those who want the paper or film to lie flat. This is the most important function of any easel. Register pins were an afterthought.

When I first was indoctrinated into the color print business and had to use a vacuum easel, the first "thing" I used was a simple vacuum frame without pins. My boss wasn't sure of the accuracy of the vacuum system because it used a water aspirator as the device that created the vacuum (see diagram).



He had me place a sheet of window glass over the matrix film so that it would lay flat when I exposed it. Another system that I used when I first joined a real top lab was a simple easel constructed of 2 sheets of illustration board that were cemented together and had a channel cut into the top sheet.



A small hole was drilled partly into one of the channels and another hole was drilled in from between the 2 sheets and made to join the first hole. A small tube was fitted into the last hole and vacuum was applied. It worked fine. (see diagram).

Later on good quality equipment was available from Kodak and other sources.

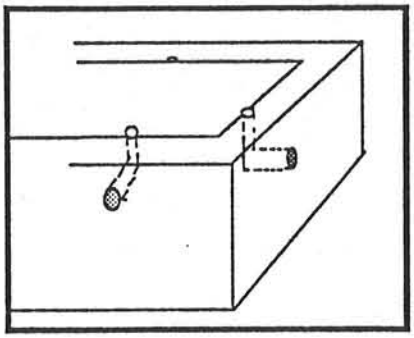
These easels were constructed to be used with a pin system such as Kodak's Matrix punch.

These worked using the same principal as the illustration board easel.

The channel worked fine, but required a little time before all of the film was "sucked" down tightly. We used to use a print roller to help activate the vacuum system when the pump was turned on.
The only problem with using any vacuum easel that uses channels to pull the film down is that, if too much vacuum pressure is used, you will get a slightly visible mark on the matrix film and if you have a picture that has a light smooth background, the channel marks will be visible.
The way to reduce this effect is to lower the vacuum pressure by using a vacuum gauge.
If you can reduce the pressure to about 6 Lbs or less without losing the grip of the vacuum system, then the lines will disappear.

The fact that matrix film is used emulsion down, may have something to do with this phenomenon.

You can build your own easel using a material call Benolex (a hard , and thick masonite), then instead of drilling a hole at one end of the unit to tying into the channel, try drilling more than one hole and making more than one connection.



This will allow you to evacuate the air much more quickly.

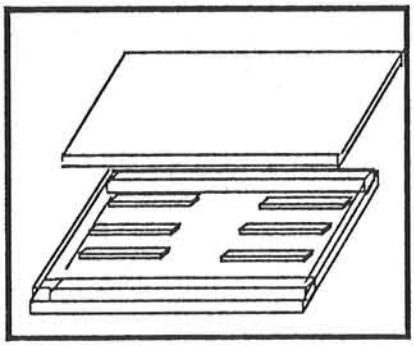
The kind of easel that I prefer is the kind that you will find on a graphic arts camera back. A flat black metal with thousands of tiny holes that act as the vacuum area.

These easels are constructed so that they are really nothing but a flat box with compartments built into its interior to help pull the air from the middle of the unit before it works its way to the outer limits of the easel.

A few manufacturer's have already been busy in this field. The most common one used by most of the west coast labs is called the By Chrome easel. It usually comes with its own vacuum pump, however, the easel can be purchased alone.

I recently built my own easel using two sheets of masonite.

The bottom sheet should be 1/4 inch material. The top sheet can be thinner, but is the sheet with all of the holes in it. You can drill your own holes if necessary.
I glued spacers in between the two sheets so that the air would travel through predetermined paths and would enable me to have a center loaded unit.
I used a common PVC fitting to enable me to utilize my vacuum pump.(see diagram).



It worked fine. There are some easels on the market that are brand new and work on the same principle.

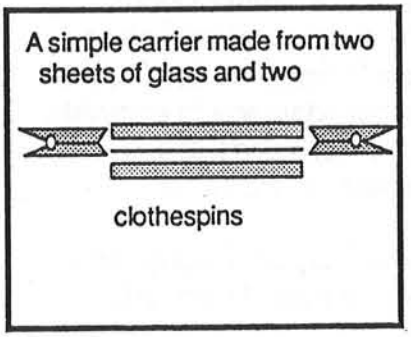
Some of the names of vacuum easel manufacturers are as follows:
Nutek
By-Chrome
Condit Mfg.
Durst

The professional method of making smooth as silk prints.

The next item to think about is about how to make prints that are as smooth as possible without losing contrast.

I was introduced to the "oil" carrier quite a long time ago.
The original reason for its use then, was to be able to use a point source enlarger to make large separation negatives, and eliminate the refraction error.
However, much to my delight, I used it on almost any kind of print or negative production as possible.

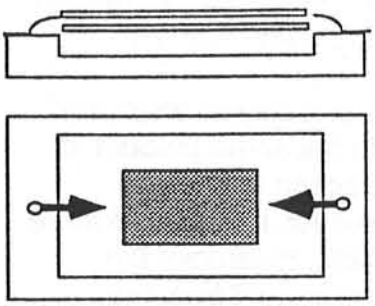
I used to make one C print every year for one of my clients, of his baby boy. These progressive pictures were important to him. But, one year, he felt that he had taken advantage of me for too long, and had another lab make his new print. Somehow, they managed to mangle his original negative, and even using a diffusion enlarger, the print exhibited scratches that were plainly visible. What to do?
He came to see me, and asked first, what caused the problem, and second, could I do something to make a more pleasing print?
He had heard about using "nose oil" to smear over the negative and maybe that would help make a smoother print.
I simply cleaned the negative, placed it into a very simple "oil" carrier and made a new print.



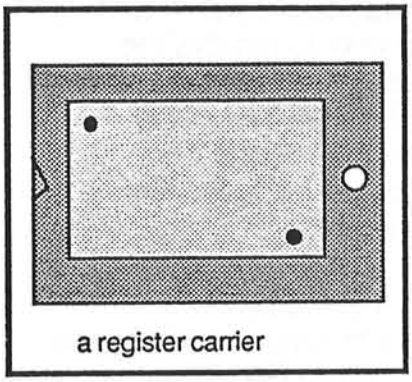
The scratches disappeared completely, and the print was excellent.
He praised me for a month.
The solution was so simple that I decided to keep it to myself and let him go on thinking that I was a genius.

However, this led me to use this simple device for many other methods of print making. To this day, if I receive a color or b & w negative or transparency from a client, I invariably place it in my "oil" system, whether it needs masking or not. This has given me a method whereby I can make consistently clean prints or negatives with smoothness and sharpness.
Admittedly, it is more work to go through these steps in order to make a superior print, but I think it is worth the trouble.

Here are a few samples of "oil" carriers.



A side view and top view



The kind of oil to use is interesting.
The first kind that we used in the Evans & Petersen Color Lab, in N.Y. was castor oil.
This works fine as caster oil's refraction index is almost the same as glass, however, we discovered that castor oil is also a softening agent and can soften the emulsion of the transparency and that it could ruin the original transparency if the film were wiped too strongly.

Cleaning the transparency with common lighter fluid was the first step in removing the castor oil. Then film cleaner was the next ingredient.

Unfortunately, rubbing with film cleaner sometimes led to disastrous results.

Mineral oil was also used with the same amount of refraction correction, however, it was even more difficult to remove the saturated oil from the emulsion. If film cleaner was used, it would take forever to remove the cloudy appearance caused by the mixture of the mineral oil and the petroleum based film cleaner.

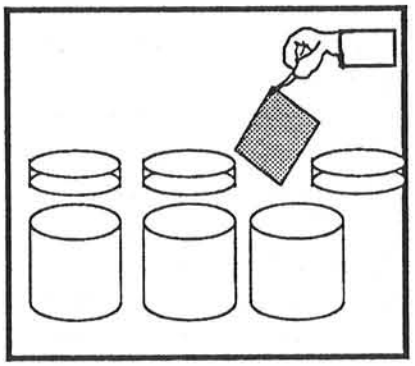
Another oil used is called immersion oil, used by the scientific field when working with microscopes. This is a petroleum product and is cleanabl. However, I found that it took too long for me to remove the oil properly.

Another chemical commonly used by dry cleaning stores is Perclorethylene (known as "perc")
The only advantage of this chemical is that there is no cleaning of the transparency as there is no oil residue left behind.

There is a problem with breathing this chemical as it is very toxic , but with the proper flow of air it could be considered safe.
Personally, I don't use it. But most of the larger New York firms use it.

Silicon. This is what I recommend.
I asked different silicon distributors to send me small samples of various viscosity, and I received about 8 different kinds. They were all very clear and contained nothing that would damage to originals. In other words, the chemical was inert.

After experimenting for a few weeks, I decided on Dow Corning's Silicon, # 200, viscosity 100. I have used this "oil" for over 35 years with great results. It costs around $50 to $60 a gallon. One gallon could last for one year, depending on your work load. Cleaning the "oil" from the transparency is quite simple.



Use three separate plastic tanks with tightly fitting covers.
Place film cleaner into each tank so that it will easily cover any original transparency.
My method is to place this oily transparency into tank #1 and cover it, shake it about for 30 seconds, remove it, using a tweezer, and place it into tank #2.

Again, cover the tank and shake the tank for another 30 seconds. Remove this original and place into tank #3 and again, shake it for 30 seconds.
Then remove the original and hang it to dry.

That's it. No rubbing or any other activity that would endanger the original.

Making Dye Transfer color prints from color negatives, using Pan Matrix Film.

I have been receiving phone calls and letters from some of my subscribers asking about making Dye Transfer prints from color negatives, and whether or not it is simpler than making separation negatives from transparencies.
The answer is yes, it is a lot simpler. The main thing to do is to establish a method of reading greys and then eventually, colors.

The method is easily explained. It involves the use of an incandescent enlarger, a quality lens, a good easel meter, a vacuum easel, but not necessarily a registration enlarger carrier.

You must first enlarge the color negative to the size of the test print you desire.

Then you must expose three sheets of Pan Matrix film, one at a time through 3 separation filters.(red, green and blue).

The matrix film is then processed dried and placed into its proper dye, then transferred just as a regular dye transfer print. But there are some exacting details to go through before you start.

The first thing to consider is just what kind of enlarger are you going to use? Is it a diffusion enlarger or a condenser enlarger? The enlarger you choose will determine what kind of changes you make in the A and B portions of your tanning developer processing.
You will not be able to use a light source that consists of a neon tube or any kind of flourescent illumination. It must be a full spectrum incandescent light source.

If you always intend to use a diffusion enlarger, you will notice a tendency to always be on the flat side of the contrast level.

On the other hand, if you use a condenser enlarger you will always be on the contrastier side of the contrast level.

Once you know what you are doing and know how to expose and develop the Pan Matrix film with ease, then the proper amount of A to B proportions can be determined by taking any color negative that is well exposed and contains a good white and black and exposing and developing a few sheets using different amounts of A and B tanning developer for each sheet. When you have found the combination that pleases you, read the contrast density range of the color negative. This will alert you to the next negative and you will know whether or not, you will have to change the proportions.

If you really want to be scientific about it, you could expose a few 21 step grey scales through a red 29 filter on separate sheets of Pan Matrix film and [process them at different levels of contrast by adjusting the A and B portions of the tanning developer. After processing and drying them and dying them in cyan dye and then transferring them to a clean sheet of mordanted paper, you could actually use a reflection densitometer and plot curves on every grey scale.
The results would give you an accurate picture of the requirements of the negative before making any prints.

You would ,at least, know what dilution of A and B to use when processing.

But let us assume that you will make a test set of matrices and adjust the color balance and the contrast level at this point.

The big question is "how do you get a grey balance?"

Let's start with a Kodak grey card. This is an excellent tool to use when balancing any color system to a grey.
Shoot a color negative of this grey card, process it, and place this negative in the enlarger The trick here is to make the following kinds of exposures on three sheets of of Pan Matrix film.

1. Size this color negative of the grey card to 8x10 Make sure that the grey card covers the full sheet of film.

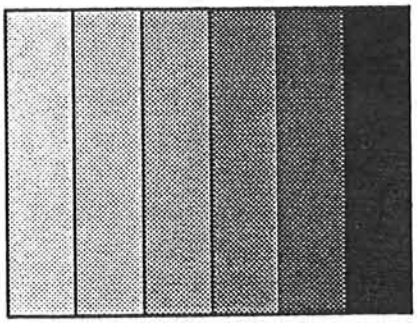
2. The enlarger must be a full spectrum light source, such as incandescent.

   In this case, a dichoic light head is not necessary

   Use a quality lens for the final printing, however, any lens will do at this stage.

3. Place a red filter (29) in the light path. The best place is above the negative . Make sure to stop the lens down to about F11.

4. Make a series of exposures (as shown) across the width of the film, from left to right.



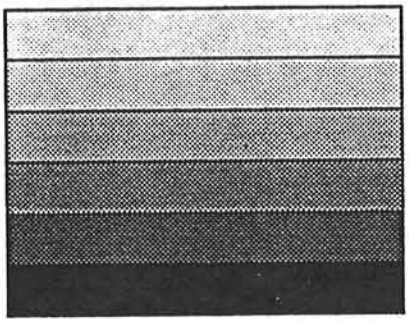
Use a sheet of black opaque material to move across the film as it is being exposed.

The exposures should be in increments of 3 seconds each and accumulate across across the film.

The last exposure on the right side of the film will have received three seconds, but the others will be increasingly heavier as you move from left. to right.

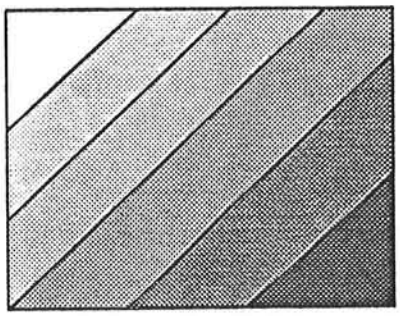
Punch this sheet of film to identify it.

Do the same with the green filter (99) but instead of going from left to right, go from top to bottom across the sheet of Pan Matrix.



Also give this sheet three seconds for each move and they will accumulate as you travel from bottom to top. Mark this sheet so that you will know it was made with the green filter.

5 . Do the same thing with the blue filter, (98). This time go across the sheet at an angle. Start at the upper left hand corner and travel to the lower right hand corner. Identify this sheet.



6. Process these three sheets at the same time in the normal A and B tanning developer proportions. Use 300 cc of A and 600 cc of B at 68 degrees. Develop for two and one half minutes.

The system I use to keep things in order and not to loose my place is as follows:

Set the timer for 3:45. After the developer is combined and placed into the tray,count ten seconds and then start the timer and place the first sheet (the red filter matrix) into the tray, keeping the tray moving and rocking. The film should be placed into the developer, emulsion down, then immediately placed emulsion up.. Rock the tray with the film in this position for a total of ten seconds, then emulsion down again.

At 15 seconds place the next sheet into the tray, emulsion down, then up, and rock for a total of another ten seconds, then emulsion down again.

At 30 seconds place the blue filter matrix into the tray and repeat the same flipping and flopping technique. When the last sheet is in place, emulsion down, start to rotate the film from the bottom to the top. Keep the tray moving and rocking all the time.

When you have reached ten seconds before the 2:30 mark on the timer, lift the red filter matrix from the tray, drain it and at exactly the 2:30 mark, place it into a tray of 1% acetic acid.
This is a stop bath that will definitely stop all development.
It is mandatory to remain in this tray for 45 seconds. It will take that long for the acid to completely reach the bottom of the swollen gelatin.
Make sure that you change the direction of the emulsion several times while it is in this tray. I have found out through many tests that 45 seconds is the minimum you should be in the tray. The film will still keep developing unless it is completely stopped. This will do it.

However, you still have two more sheets to worry about.
At the 2:45 mark on the timer, place the green filter matrix into the stop bath, and at the 3 minute mark, place the blue filter sheet in the stop bath . Keep the tray and film moving constantly.
At the 3:15 min. mark remove the red filter sheet from the stop bath and place it into the non hardening fixer. Use the same technique for moving the tray and flipping the sheets of film.
At 3:30 place the green filter sheet in the fixer and at 3:45 place the blue filter sheet into the fixer.
One minute in the fixer and the room light can be turned on.

This has all taken place in total darkness.

The reason for identifying the films will be easily understood if you didn't mark them and got lost in the process.

At this point, hot rinse off each sheet in order, and hang them to dry thoroughly.
Place them into their corresponding dyes.
The red filter sheet into cyan dye, the green filter sheet into magenta dye and the blue filter sheet into yellow dye for 5 minutes each.
These sheets can be easily handled if they have been punched to fit the pins on your transfer table. Do this at the beginning of the tests.
Transfer each matrix for 5 minutes to a fresh sheet of properly conditioned dye transfer paper. When the transfer time is up ,peel the matrix from the paper and , you should have a sheet of multicolored boxes. One of these boxes should be close enough to a grey that you will be able to identify and count which exposure it received from each filter.

Once you establish this spot, and the three exposures, place a quality meter centered on the easel under the enlarger. Place the red filter in the light path and read the result on your easel meter. If it is a digital meter such as a Wallace Fisher or a multi-layered machine such as a SpeedMaster you should be able to record the numbers or set the Speedmaster to a null, representing zero. Do this for all three filters. **You now know the readings and exposures that were required to make a grey from a specific negative.**
In order to establish the proper exposure for a new negative, you must find a neutral grey area in the shot, place the probe of the meter on that spot, then place the red filter in the light beam and adjust the F stop on the enlarging lens to match the reading you have recorded for the red filter exposure.
Let us assume that the original exposure was **10 seconds.** Record this new exposure.
Then replace the red filter with the green filter and just read the meter.

Don't touch anything. Just read the meter.
If the exposure for the green filter test was 15 seconds and the new reading is the same, then record this new exposure time for the green as 15 seconds. However, if the reading is different (and it usually is), make an adjustment in the exposure depending on what kind of meter you are using. If it is a digital meter, then the differences can be worked out using the log scale on a scientific calculator or a round exposure calculator slide rule sold by Kodak. For instance, if the original reading was .45 and the exposure was 15 seconds, all we need to know is the new reading. Let us assume that the new reading is .55. The difference is .10.
Using a log scale on a calculator do the following.

1. Press....10 (difference)
2. press ...Inv
3. press ....Log
4. press..... X
5. press ...15 (original exp)
6. press...= (the answer is **18.89 or 18.9 sec.**

Do the same for the blue filter reading and establish a new exposure. Let us assume the new blue exposure is 25 seconds. The new balance is then
red filter 10
green 18.9,
blue 25

These will be the exposure times that you will use for the **Test.**

This is basically the method that I have used very successfully for many years. There are other approaches to the subject. If you have a video negative anylizer, it may be easier to make a balance and come up with a good set of matrices this way.The cost of a video system usually is beyond the pocketbook of most darkroom enthusiasts.

In order to make sure that your negative is printed as cleanly as possible, make sure that all dust specks are blown off or wiped off the negative. If you have abrasions on the original negative, these can be eliminated by using an oil immersion carrier and using Silicon # 200, viscosity 100, you will be able to eliminate the scratches (unless they are gouges) and also eliminate any refraction from the glass in the carrier. If your original is clean and no heat will distort the shape of the negative, then use a glassless carrier.
I personally prefer the oil system.

The rest of the system is exactly the same as it is for the Dye Transfer process from transparencies. All of the running corrections apply here, too.

Once you make a great print by making adjustments and corrections, then you must be able to read various areas on the easel, such as different flesh tones, whites, greys and specific colors. Keep a print on your wall, and write the actual numbers or readings on the white borders, and determine in advance, just what kind of effect you are looking for. You should be able to make a flesh tone fit any kind of color balance that you want.
If you have a C print to go by, you will save lots of time determing which is a white or grey.

For those of you who have not yet subscribed to this newsletter, the cost is $60 per year.
My book, "The Art of Photo Composition" is still available at $50 per copy.

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Video news:
We have finsihed the shooting script and are close to the actual shooting schedule.
Hopefully, we will be done by Christmas or early January.
I never realized how complicated it would be to do something that requires so much preparation.
I will let you all know when we are finished.